

NorCal Engineering
Soils and Geotechnical Consultants
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April 20, 2000

Project Number 5936-96

Boeing Realty Corporation
4060 Lakewood Boulevard
Long Beach, California 90808-1700

Attn: Mr. Johnny Marasco

RE: **Report of Geotechnical Observation and Testing of Rough Grading Operations** – Proposed Harborage Way Development – Located at the Southwest Corner of Francisco Street and Normandie Avenue, in the City of Los Angeles, California (Legal Description: Tract No. 52172, Lot 1)

Dear Mr. Marasco:

Pursuant to your request, this firm has geotechnically observed and tested rough grading operations at the above referenced project. Results of the compaction tests are attached and locations of these tests are shown on the accompanying Site Plan. All work was performed in accordance with our Geotechnical Investigation dated March 18, 1996, Project Number 5936-96 and all present day standards of the Geotechnical Engineering Industry.

Site Grading

All vegetation and demolition debris was stripped and removed from the fill area prior to grading operations. The existing low density soils were removed to competent native soils, the exposed subgrade scarified moisture conditioned and then recompacted to a minimum of 90% relative compaction. All excavations were observed and approved by this firm prior to placement of fill material.

Fill soils placed were compacted to a minimum of 90% of the laboratory standard in lifts not in excess of eight inches in thickness. The maximum depth of fill placed was 7 feet. Conventional earthmoving equipment was utilized for compaction control. A water truck provided moisture control. The approximate limits of compacted fill are indicated on the attached Site Plan.

Import soils were generally approved for use on site by their expansion index and maximum density characteristics. Direct shear testing of the soils should be included as a part of a site-specific geotechnical investigation once development plans are described on.

Laboratory/Field Testing

The relative compaction was determined by Sand Cone Method (ASTM: D1556-82) and by the Drive Tube Method (ASTM: D2937). The maximum density of the fill soils was obtained by the laboratory standard (ASTM: D1557-91) and results are shown on Table I. Tests were performed a minimum of every 500 cubic yards placed and every two feet in depth of fill placed. Results of field density tests are presented in Table II.

Recommendations

Development of the site is feasible based upon our observations and testing of grading operations. Prior to development of any portion of the site, a detailed subsurface geotechnical investigation should be undertaken to provide remedial grading and construction recommendations specific to the planned development. Complete building and grading plans should be reviewed by the soil engineer prior to construction.

Conclusions

Fill soils are currently classified as "secondary" and are suitable for support of additional fill soils, slabs and pavement. (Note: A detailed subsurface investigation including proper laboratory analysis of the graded soils may be completed in order to change the classification of the graded fill to "primary", and suitable for support of structural foundations).

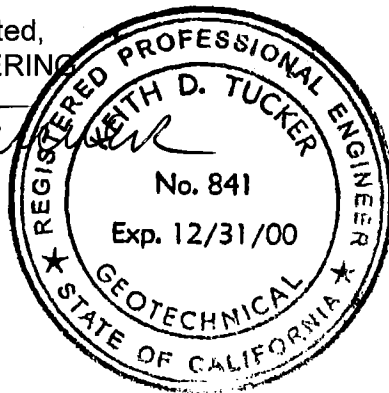
The geotechnical engineering aspects of the grading have been observed and are in compliance with the geotechnical engineer's recommendations. The development has been graded to the approval of this firm and is suitable for its intended use.

We appreciate this opportunity to be of service to you. If you have any further questions, please do not hesitate to contact the undersigned.

Respectfully submitted,
NORCAL ENGINEERING

Keith D. Tucker

Keith D. Tucker
Project Engineer
R.G.E. 841



Gregory H. Bennett

Gregory H. Bennett
Project Manager

NorCal Engineering

TABLE I
MAXIMUM DENSITY TESTS
(ASTM: D1557-91)

<u>Sample</u>	<u>Classification</u>	<u>Optimum Moisture</u>	<u>Maximum Dry Density (lbs./cu.ft.)</u>
I	Clayey SILT	12.0	121.0
II	Silty, sandy CLAY with gravel	10.5	125.5
III	Silty CLAY	14.0	110.0
IV	Silty CLAY	13.0	112.0
V	Silty CLAY with gravel	15.0	121.0
VI	Silty CLAY with occasional gravel	13.5	119.0
VII	slightly silty clayey SAND	12.0	122.0
VIII	Clayey silty sandy with occasional gravel	11.0	125.0
IX	Silty, sandy CLAY with gravel	10.5	128.0
X	Clayey silty sandy with occasional gravel	11.0	125.0

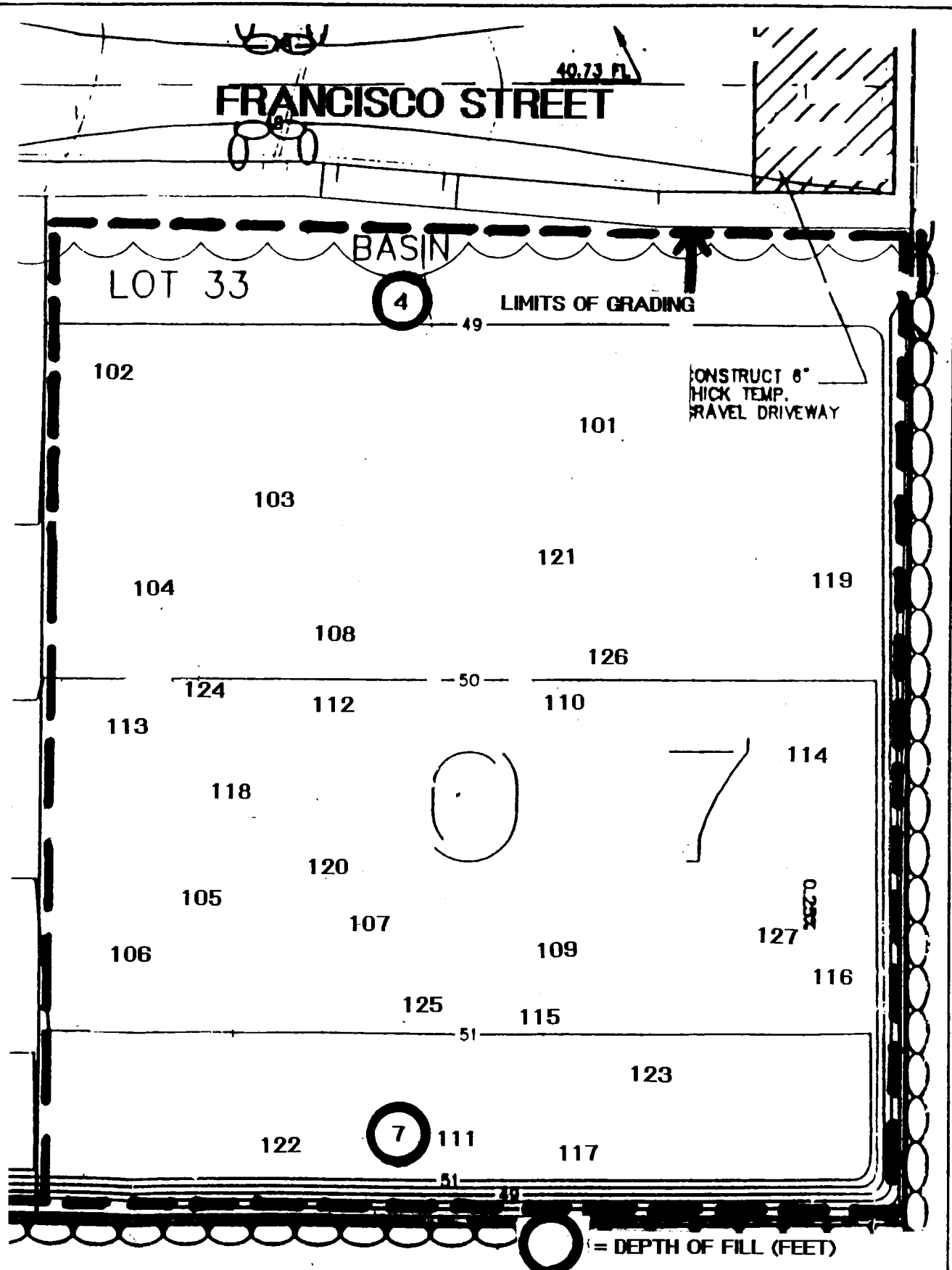
SUMMARY OF COMPACTION TEST RESULTS

<u>Date of Test</u>	<u>Test No.</u>	<u>Location</u>	<u>Depth</u>	<u>Percent Moisture</u>	<u>Unit Wt. lbs./cu.ft.</u>	<u>Relative Compaction</u>	<u>Soil Type</u>	<u>Test S/D</u>
11/1/99	101	Site Grading	4.0-4.5	8.7	105.8	87	I	D
11/1/99	101A**	Site Grading	4.0-4.5	11.3	112.3	93	I	S
11/1/99	102	Site Grading	3.0-3.5	10.7	115.6	92	II	D
11/1/99	103	Site Grading	2.0-2.5	11.3	115.0	92	II	D
3/28/00	104	Site Grading	8.0-8.5	14.6	104.7	95	III	D
3/28/00	105	Site Grading	8.0-8.5	13.5	103.9	93	IV	D
3/29/00	106	Site Grading	6.0-6.5	12.1	107.9	91	VI	D
3/29/00	107	Site Grading	6.0-6.5	13.3	112.9	93	V	D
3/29/00	108	Site Grading	6.0-6.5	15.2	114.8	92	VII	S
3/29/00	109	Site Grading	7.0-7.5	14.5	109.1	90	I	D
3/30/00	110	Site Grading	5.0-5.5	11.9	116.1	91	VIII	D
3/30/00	111	Site Grading	7.0-7.5	10.5	114.9	90	VIII	D
3/30/00	112	Site Grading	4.0-4.5	12.7	114.7	95	IV	S
3/30/00	113	Site Grading	4.0-4.5	13.6	116.1	91	IX	D
3/31/00	114	Site Grading	6.0-6.5	10.6	115.7	90	IX	D
4/3/00	115	Site Grading	3.0-3.5	12.8	113.4	91	VII	D
4/3/00	116	Site Grading	4.0-4.5	13.6	109.1	92	X	D
4/3/00	117	Site Grading	5.0-5.5	12.1	113.8	94	V	S
4/3/00	118	Site Grading	2.0-2.5	13.9	115.1	92	VII	D
4/4/00	119	Site Grading	2.0-2.5	13.5	111.8	92	I	D
4/4/00	120	Site Grading	2.0-2.5	14.2	107.7	96	IV	D
4/4/00	121	Site Grading	1.0-1.5	11.9	108.1	91	VI	D
4/4/00	122	Site Grading	3.0-3.5	13.6	116.2	91	VIII	S
4/14/00	123	Site Grading	1.0-1.5	15.8	113.9	94	IV	D
4/17/00	124	Site Grading	0.0-0.5	15.3	112.7	93	I	D
4/17/00	125	Site Grading	0.0-0.5	14.8	111.4	92	I	D
4/17/00	126	Site Grading	0.0-0.5	13.8	111.5	92	IV	D
4/17/00	127	Site Grading	0.0-0.5	16.3	113.4	93	I	S

S = Sand Cone Method

D = Drive Tube Method

**Retest of failing tests after area reworked



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SITE PLAN
LOCATION OF COMPACTION TESTS

PROJECT 5936-96 DATE APRIL 2000